



AMENDMENTS TO THE SPECIFICATION

On page 1, after the Title, please insert the following heading:

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

On page 1, between lines 3 and 4, please insert the following heading:

DISCUSSION OF THE BACKGROUND

Please amend the paragraph on page 3, lines 4-17, as follows:

However, using the method proposed in DE 44 19 476 C2 it is unfavourable that the superposed signals from thermal radiation and reflected radiation have to be separated in a complex manner before they can be measured and analysed. This detection of thermal radiation and reflected radiation that has necessarily to be performed separately is carried out in DE 44 19 476 C2 by a complex arrangement by means of twofold phase sensitive frequency modulation using so called chopper and lock-in amplifier. Because of this twofold modulation typical it is not possible to measure exactly industrial applications, which depend on a high resolution in time (as for example fast rotating samples in multi ~~waver~~-wafer reactors) because it is impossible to distinguish between sample carrier and sample due to the inevitably reduced resolution in time of the detection system . For this reason in WO 02/26435 A1 an arrangement was proposed,

where a distinction between sample temperature and sample carrier temperature becomes possible by using a combination of several pyrometers. However, the simultaneous use of several pyrometers is a very complex and cost intensive solution as well.

Please insert the paragraph on page 3, between lines 22 and 23, as follows:

SUMMARY OF THE INVENTION

Please amend the paragraph beginning on page 3, line 23, as follows:

Therefore it is the object of the invention to provide a method for the determination of characteristic layer parameters by means of spectral-optical measurements, that allow for precise measurements of the sample temperature even under the conditions of industrial growth processes, i.e. wobbling samples and/or fast changes between sample carrier and sample and furthermore avoids the detection of thermal radiation and reflected radiation by means of twofold phase sensitive frequency modulation by using so called chopper and lock-in amplifier respectively ~~several pyrometers~~. Thereby a simultaneous or nearly simultaneous measurement of the absolute temperature of the layer sample as well as at least one additional spectroscopic-optical measuring value should become possible easily in order to realize real-time determination of characteristic values of the layer system (for example layer thickness in high temperature processes). Furthermore an apparatus for the realization of the method in the spirit of the invention shall be specified.

Please delete the paragraph beginning on page 4, line 9, as follows:

~~This object is solved in the spirit of the invention through the features in the characterising portion of claim 1 (method claim) and the features in claim 13 (apparatus claim) in combination with the features in the preamble of these patent claims. Preferred embodiments of the invention are disclosed in the sub-claims.~~

Please amend the paragraph beginning on page 5, line 23, as follows:

In case of reflectance anisotropy spectroscopy a separate detection of the pyrometer signal and the spectral-optical signal can preferably be implemented by the construction of the analyser-prisms as beam splitting polarization prism. Thereby the detection angle of the pyrometer with respect to the ~~sample perpendicular~~ line perpendicular to the sample will be identically equal to the angle of incidence of the spectral-optical measurement with respect to the sample perpendicular .

Please amend the paragraph beginning on page 6, lines 6-7, as follows:

The calculation of the effective emissivity $\langle \epsilon \rangle$ of a sample can be carried out with the aid of an ~~anti-tunneling mirror~~ anti-wobbling mirror according to the formula:

Please insert the following paragraphs on page 7, between lines 9 and 10, as follows:

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein

Please delete the paragraph on page 7, line 12, as follows:

~~It shows~~

Please insert the following paragraph on page 8, between lines 2 and 3, as follows:

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please amend the paragraph on page 8, lines 3, as follows:

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views and more particularly to Fig.1 which shows a
schematic representation of an apparatus in the scope of the invention. The emissivity corrected pyrometer 10 determines the sample temperature (Ts) of a wobbling (or otherwise non ideal reflecting) sample 14, that is mounted on the sample carrier 24. A suitable wobbling

compensation optics 26 enables the prevention of an unwanted intensity drop during the measurement caused by a non ideal reflecting sample. Such an anti-wobbling-optics can be realised for oblique incidence of light by a spherical mirror 12 as shown in Figs. 2 and 3. Therefore the mirror 12 and sample 14 have to be arranged in such a way, that the sample is located in the centre of the curvature of the spherical mirror 12. For a perpendicular incidence of light the anti-wobbling-optics can be implemented by an aperture 28, a lens 30 and a beam splitter 16, as shown in Fig. 4. The spectral-optical measurement 20 of layer parameters is connected with the pyrometer via an suitable arrangement in such a way, that on the one hand the measurement can be performed at the same time and at identical measurement conditions (for example same angle of incidence) and on the other hand the sample temperature (T_P) as measured by the pyrometer can be used immediately for the analysis of the spectral-optical measurement 20.

Please amend the paragraph beginning on page 8, line 23, as follows:

Fig. 2 shows a schematic representation of an apparatus in the spirit of the invention with wobbling-compensating mirror 12 and two beam splitters 16. This enables, by introduction of an effective emissivity $\langle \epsilon \rangle$ (of the sample in interaction with the anti-wobbling-optic), that in addition to the spectral-optical measurement 20 and in spite of the intensity change due to the anti-wobbling-optics 12 a correct sample temperature (T_P) can be measured. When reflectance anisotropy spectroscopy is used, the separation of the pyrometer optical path and the optical path of the spectral-optical system is caused by a beam dividing polarizing prism used as beam

splitter 16. The spectral-optical measurement 20 of layer parameters is implemented in this embodiment by a reflectance anisotropy measurement or a spectral reflectance measurement. The complete arrangement incorporates spectral-optical measurement 20 and pyrometer 10 via an additional beam splitter. In a further embodiment this can be implemented by an arrangement, in which the pyrometric detection is rotated out of the plane of spectral-optical measurement 20, anti-wobbling-mirror 12, whereby the angle of incidence is identical, as shown in Fig. 3.